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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,257	12/02/2003	Francis M. Aguirre	59432US002	3530

32692 7590 03/20/2006

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EXAMINER	
QUASH, ANTHONY G	

ART UNIT	PAPER NUMBER
2881	

DATE MAILED: 03/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/726,257	AGUIRRE ET AL.	
	Examiner	Art Unit	
	Anthony Quash	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 October 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *see inside case*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Applicants' amendment filed, 10/21/05, has overcome the objections to the specification and the 112 rejections listed in the previous office action.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 5/27/05, 9/15/05,1/23/06, was filed after the mailing date of the Non-final rejection on 5/. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-6,8,9,11,13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hed [5,301,090]. As per claims 1,3,9, Hed [5,301,090] teaches a plurality of solid state radiation sources (LEDs figs. 1-3,5,7) to generate radiation, a plurality of optical concentrators (col. 9 lines 1-10, elements 74,75,76), wherein each concentrator receives radiation form a corresponding one of the solid state radiation sources, a

plurality of optical waveguides (abstract, figs. 1-3,5,7, elements 77,78,73) wherein each of the plurality of optical waveguides includes a first end and a second end, wherein each first end receives concentrated radiation from a corresponding concentrator, and a support structure (col. 4 lines 64-68, col. 7 lines 1-25, 58-68, col. 11 lines 55-65 elements 80,82) to stabilize the plurality of optical waveguides between the first and second ends. Also see Hed [5,301,090] abstract, figs. 1-3,5,7, col. 1 lines 65-68, col. 2 lines 1-5,45-55,65-68, col. 3 lines 15-28,48-58, col. 4 lines 1-10,64-69, col. 5 lines 5-40, 65-69, col. 5 lines 1-25, column 7, col. 8 lines 10-20,35-45, col. 9 lines 1-15,50-55,65-68, col. 10 lines 1-25, 60-68, column 11, col. 12 lines 65-68, and col. 13 lines 60-68. However, it does not explicitly state an interconnect circuit layer to provide electrical connection to the plurality of solid state radiation sources, a heat exchanger unit, and a thermally conductive and electrically insulative material to thermally couple the interconnect circuit to the heat exchange unit. Hed [5,301,090] does however, teach/imply an interconnection circuit layer being provide to provide electrical connection of solid-state radiation sources. This is made evident when Hed [5,301,090] states, "The fastening assemblies serve a dual role, first they allow for interconnecting adjacent luminaries, second they provide for electrical connections to the light emitting diodes within the luminaries." "Fig. 2B shows the female plug with its respective inserts 24a, 25a, and 26a for the light emitting diode conductors and 27a for the common ground conductor. The plugs have a built-in symmetry to assure correct interconnection between modules." See Hed [5,301,090] figs. 2-3 (it is inherent that the controller, which is an electrical controller, would have a circuit), col. 7 lines 10-16, 25-

32. With respect to applicant's claim concerning a heat exchanger unit, this aspect is implied by Hed [5,301,090]. See Hed [5,301,090] fig. 3, col. 1 lines 65-col. 2 line 2, col. 9 lines 65-col. 10 lines 15, 60-68. With respect to applicant's claim concerning the thermal coupling of the interconnect layer to the heat exchange unit col. 7 lines 1-16,55-68. Here it states that the luminaries can be fastened to various surfaces by a variety of means including an adhesive band. Also see Hed [5,301,090] abstract, figs. 1-3,5,7, col. 1 lines 65-68, col. 2 lines 1-5,45-55,65-68, col. 3 lines 15-28,48-58, col. 4 lines 1-10,64-69, col. 5 lines 5-40, 65-69, col. 5 lines 1-25, column 7, col. 8 lines 10-20,35-45, col. 9 lines 1-15,50-55,65-68, col. 10 lines 1-25, 60-68, column 11, col. 12 lines 65-68, and col. 13 lines 60-68. Therefore it is the examiner's view that Hed [5,301,090] does indeed teach applicants' claim.

As per claim 2, Hed [5,301,090] discloses the plurality of solid-state radiation sources comprising a plurality of LED dies (red, green, blue LEDs, col. 11 line 7).

As per claim 3, Hed [5,301,090] discloses an interconnect circuit layer to provide electrical connection to the plurality of LED dies, a heat exchange unit, and the interconnect circuit layer being thermally coupled to the heat exchange unit. See Hed [5,301,090] (fig. 3, col. 9 line 65 – col. 10 line 15).

As per claim 4, Hed [5,301,090] discloses the plurality of waveguides comprising a plurality of optical fibers. See Hed [5,301,090] col. 11 line 13.

As per claim 5, Hed [5,301,090] discloses a fiber array connector to support the first ends of the plurality of fibers in a defined pattern. See Hed [5,301,090] figs. **2**-3,5.

As per claim 6, Hed [5,301,090] discloses the support comprising a housing that encloses at least a portion of the plurality of optical fibers. See Hed [5,301,090] abstract, col. 3 lines 15-35, col. 5 lines 5-15.

As per claim 8, Hed [5,301,090] discloses a banding to surround and secure at least the first portion of the second ends of the fibers. See Hed [5,301,090] figs. 2,5,7, col. 7 lines 1-35,58-68, col. 11 lines 55-66.

As per claim 11, Hed [5,301,090] discloses an optical element to collect (CPC) and distribute optical radiation from the optical waveguide second ends in a selected light distribution pattern. See Hed [5,301,090] fig. 5, col. 4 lines 4-10, col. 11 line 55 - col. 12 line 10.

As per claim 13, Hed [5,301,090] discloses the second ends of the fibers being bundled. See Hed [5,301,090] col. 11 lines 5-40, 55-65,col. 13 lines 60 – col. 14 line 5.

Claims 7,14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hed [5,301,090]. As per claim 7, Hed [5,301,090] discloses a heat exchange unit (fig. 3, col. 9 line 65 – col. 10 line 15). However, it does not explicitly state the heat exchange unit being disposed in a direction opposite to the emitted radiation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the heat exchange unit be disposed in a direction opposite to the emitted radiation, since it has been held that rearranging parts of an invention involves only routine skill in the art.

As per claim 14, Hed [5,301,090] teaches an interconnect circuit (figs. 2-2b, col. 7 lines 25-35) layer to provide electrical connection to the plurality of LED dies, wherein

the plurality of LED dies is arranged in a first grouping and a second grouping, wherein the first grouping of LED dies is connected to a first portion of the interconnect circuit layer and the second grouping of LED dies is connected to a second portion of the interconnect circuit layer. See Hed [5,301,090] col. 4 lines 1-10.

As per claims 15-16, Hed [5,301,090] teaches a first output intensity of at least one LED die of the first grouping of LED dies is controllable separate from a second output intensity of at least one LED die of the second grouping of the LED dies and the material receiving radiation when one of the groupings of LED dies is not activated. See Hed [5,301,090] abstract, figs. 1-3,5,7, col. 1 lines 65-68, col. 2 lines 1-5,45-55,65-68, col. 3 lines 15-28,48-58, col. 4 lines 1-10,64-69, col. 5 lines 5-40, 65-69, col. 5 lines 1-25, column 7, col. 8 lines 10-20,35-45, col. 9 lines 1-15,50-55,65-68, col. 10 lines 1-25, 60-68, column 11, col. 12 lines 65-68, and col. 13 lines 60-68.

As per claim 17, Hed [5,301,090] teaches all aspects of the claim except for explicitly stating that the plurality of LED dies irradiate UV radiation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the plurality of LED dies irradiate UV radiation, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claim 18, Hed [5,301,090] teaches the second ends of the fibers being patterned to uniformly irradiate the first material. See Hed [5,301,090] figs. 1-3,5,7.

Claims 1,10,12,17,19-26, 29-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dissuading [6,692,250] in view of Hed [5,301,090]. As per claims

1,19,31,34 Decaudin [6,692,250] teaches a solid state ultraviolet radiation source comprising a plurality of LED dies to generate radiation that cures a first material, a plurality of optical concentrators (abstract, col. 4 lines 1-30, element 23'), a plurality of optical waveguides (optical fibers), wherein each of the plurality of optical waveguides includes a first and second end, and wherein the first end receives concentrated radiation from the a corresponding concentrator. See Decaudin [6,692,250] abstract, figs. 1-2b, 4, col. 3 line 55 – col. 4 line 48, col. 5 lines 1-35,45-55, 65 – col. 6 line 30, 64 - col. 7 line 5, 20-35. However, Decaudin [6,692,250] does not explicitly state a support structure to stabilize the plurality of optical waveguides between the first and second ends. Hed [5,301,090] does teach a support structure to stabilize the plurality of optical waveguides between the first and second ends. See Hed [5,301,090] (col. 4 lines 64-68, col. 7 lines 1-25, 58-68, col. 11 lines 55-65 elements 80,82). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have a support structure to stabilize the plurality of optical waveguides between the first and second ends in order to prevent damage to the optical fibers by outside forces and aid in supporting the fibers thereby preventing the dislodging of the fibers from there LED. However, neither Decaudin [6,692,250] nor Hed [5,301,090] explicitly state a substrate to support the radiation-curable chemical formulation. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a substrate (stage, table, etc) to support the radiation-curable chemical formulation in order to allow one to uniformly cure/irradiate the material since it was well known in the art to provide a supporting structure to allow one to irradiate a material on a surface.

As per claim 10, Decaudin [6,692,250] in view of Hed [5,301,090] teach all aspects of the claim except for explicitly stating the device comprising first and second alignment pins wherein the interconnect circuit layer includes the alignment holes to receive the alignment pins. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have first and second alignment pins wherein the interconnect circuit layer includes the alignment holes to receive the alignment pins in order to aid in providing proper alignment of the optical fibers with the LED sources.

As per claims 12, 37, Decaudin [6,692,250] teaches the solid-state radiation sources emitting a high intensity irradiance profile that cures the first material in cross-machine and machine direction. See Decaudin [6,692,250] col. 5 lines 5-40.

As per claim 17, Decaudin [6,692,250] teaches at least a portion of the plurality of LED dies comprise ultraviolet (UV) emitting LED dies. See Decaudin [6,692,250] col. 5 lines 20-35.

As per claims 20-21,32, Decaudin [6,692,250] teaches the controller coupled to the solid state light source, to selectively activate one or more groups of the plurality of dies, and the controller being adapted to selectively activate a first group of LED dies to emit radiation corresponding to a first absorption band of a first radiation-curable chemical formulation. See Decaudin [6,692,250] col. 3 lines 1-5, 55 – col. 4 line 15, col. 5 lines 1-35.

As per claims 22,33, Decaudin [6,692,250] teaches the controller being adapted to selectively activate a second group of LED dies to emit radiation corresponding to a

second absorption band of a second radiation-curable formulation. See Decaudin [6,692,250] col. 3 lines 1-5, 55 – col. 4 line 15, col. 5 lines 1-35.

As per claim 23, Decaudin [6,692,250] in view of Hed [5,301,090] teach all aspects of the claim except for explicitly stating a heat exchange unit coupled to the solid state light source that is disposed opposite a direction of output radiation. Hed [5,301,090] does teach a heat exchange unit (fig. 3, col. 9 line 65 – col. 10 line 15). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the heat exchange unit be disposed in a direction opposite to the emitted radiation, since it has been held that rearranging parts of an invention involves only routine skill in the art.

As per claim 24,35 Decaudin [6,692,250] teaches the controller selectively activates a first LED die group in response to a trigger signal. See Decaudin [6,692,250] col. 3 lines 1-5, 55 – col. 4 line 15, col. 5 lines 1-35. Also see Hed [5,301,090] col. 4 lines 4-10, col. 5 lines 5-15 and col. 8 lines 28-40.

As per claim 25, Hed [5,301,090] teaches the controller sends an increase drive current to a first LED die channel to compensate for a reduced emission output from a second LED die channel. See Hed [5,301,090] col. 6 lines 45-55, col. 8 lines 25-40. Also see Decaudin [6,692,250] col. 3 lines 1-10, 60-68, col, 5 lines 1-25.

As per claims 26,36, Hed [5,301,090] teaches the plurality of fibers output a selected steerable illumination pattern. See Hed [5,301,090] abstract, figs. 1-3,5,7, col. 1 lines 65-68, col. 2 lines 1-5,45-55,65-68, col. 3 lines 15-28,48-58, col. 4 lines 1-10,64-69, col. 5 lines 5-40, 65-69, col. 5 lines 1-25, column 7, col. 8 lines 10-20,35-45, col. 9

lines 1-15,50-55,65-68, col. 10 lines 1-25, 60-68, column 11, col. 12 lines 65-68, and col. 13 lines 60-68. Also see Decaudin [6,692,250] col. 3 lines 1-10, 60-68, col, 5 lines 1-25.

As per claim 29, Hed [5,301,090] teaches a collecting lens interposed at a selected distance between the second ends of the fibers and where the radiation-curable substrate would be located. See Hed [5,301,090] teaches col. 12 line 60 – col. 13 line 15.

As per claim 30, Decaudin [6,692,250] in view of Hed [5,301,090] teach all aspects of the claim except for explicitly stating that the radiation curable chemical formulation being disposed on a non-uniform structure and wherein the second ends of the fibers are patterned to uniformly irradiate the radiation curable chemical formulation. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the radiation curable chemical formulation being disposed on a non-uniform structure and wherein the second ends of the fibers are patterned to uniformly irradiate the radiation curable chemical formulation in order to brighten and harden teeth, since it was well known in the art to irradiate a resin (located on one's teeth) responsive to uv radiation in order to harden and brighten them.

Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Decaudin [6,692,250] in view of Hed [5,301,090] as applied to claim 19 above, and further in view of Bi [2003/0117691]. With respect to claims 27-28, Decaudin [6,692,250] in view of Hed [5,301,090] teach all aspects of the claims except for explicitly stating the substrate being disposed on a movable platform and the substrate

being suspended between movable rollers. Bi [2003/0117691] does teach the substrate being disposed on a movable platform and the substrate being suspended between movable rollers. See Bi [2003/0117691] abstract, paragraphs [0014, 0024,0097,0145-0146,0152]. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the substrate be disposed on a movable platform and the substrate be suspended between movable rollers in order to aid in conveying the substrate and chemical formulation material to the exact position to be irradiated by the beam.

Response to Arguments

Applicant's arguments with respect to claims 1-9,11,13,14-18 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed 10/21/05 have been fully considered but they are not persuasive. With respect to applicants' arguments concerning Hed [5,301,090] not teaching ultraviolet light, this argument is not persuasive since Decaudin [6,692,250] was used for this teaching. See the passage with respect to Decaudin [6,692,250] listed in rejection above.

With respect to the applicants arguments concerning reasons to combine,

In response to applicant's argument that there is no reason to combine Decaudin [6,692,250] in view of Hed [5,301,090], the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art

cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (571)-272-2480. The examiner can normally be reached on Monday thru Friday 9 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571)-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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